

## SECTION C Descriptions and Specifications

**SPECIFICATION FOR ENGINEERING AND TECHNICAL SUPPORT SERVICES****1.0 Introduction:**

Naval Surface Warfare Center, Carderock Division, (NSWCCD) Machinery Research and Development Directorate, Propulsion and Auxiliary Systems Department, Climate Control Branch (Code 822) is responsible for the heating, ventilation, air conditioning, refrigeration and chilled water systems of all naval surface vessels.

The Contractor shall perform task assignments within the general scope of work described in the following paragraphs to assist with these responsibilities. The scope of work will include research, development, analysis and evaluation of heating, ventilation, air conditioning, refrigeration and chilled water systems for naval vessels.

**2.0 Scope:**

The Contractor shall provide technical support within the scope of the following task areas. Task deliverables will consist of documentation, data and materials in accordance with the task statement and the Contract Data Requirements List (Form DD 1423) of the base contract.

**2.1 Task A – Perform data reduction and analysis of data taken at the NSWCCD**

Annapolis facility during the CFC Elimination Program Development phase. Typically this data will involve compressor mapping, air conditioning performance, and acoustic measurements. The CFC-114 legacy AC system, HFC-236fa AC systems, HFC-134a AC system and HFC-134a refrigeration systems may be analyzed.

- 2.1.1 Reduce test data from a binary format to a useable format utilizing Fortran programs. Modify Fortran program as necessary to ensure reduced data is accurate.
- 2.1.2 Analyze the integration of instrumentation with hardware.
- 2.1.3 Analyze data and summaries results.
- 2.1.4 Draft technical reports documenting results obtained by data acquisition including detailed analysis, concise text and graphical figures to explain complicated concepts being reported.

**2.2 Task B – Support research, development, acquisition, test and evaluation (RDT&E) efforts relevant to the Navy's heating, ventilation, air conditioning, refrigeration and chilled water systems. Specifically, most of the support will involve the HFC-236fa air conditioning plant conversion kits involved in the CFC Elimination Program (125-ton, 150-ton, 200-ton, 250-ton, 300-ton and 363-ton).**

- 2.2.1 Develop analytical and finite element computational fluid dynamics (CFD) models of specific portions of Navy refrigeration and air conditioning and chilled water systems sufficient for predicting the effect of changes in flow and temperature for the various ship classes and A/C plant capacities.
- 2.2.2 Analyze optimum gear and impeller selection for AC plants not demonstrated in the laboratory.
- 2.2.3 Analyze and recommend design improvement of control algorithms utilized by AC plants of various capacity and refrigerants.
- 2.2.4 Analyze and recommend design improvements to modify compressor's diffuser plate and volute to improve compressor efficiency.
- 2.2.5 Prepare recommended inputs for program/project briefings and presentations.
- 2.2.6 Analyze program/project status and prepare summary documentation.
- 2.2.7 Analyze and prepare updates for financial/technical plans of action and milestones (POA&M).
- 2.2.8 Prepare recommendations for inputs on resource requirements for long range planning.

**2.3 TASK C** - Analyze technical goals and facility requirements to support research, development, test and evaluation efforts heating, ventilation, air conditioning and refrigeration systems at NSWCCD, Philadelphia Detachment.

- 2.3.1 Provide recommendations for design improvements to the facility equipment, prepare test procedures and test plans, prepare logistic documentation to support test facility and prepare draft reports of test findings with recommendations.
- 2.3.2 Provide textual and graphic descriptions of the test and facility equipment.
- 2.3.3 Prepare and/or evaluate integration of instrumentation/data acquisition with HVAC&R hardware.
- 2.3.4 Analyze data and draft reports summarizing test findings with recommendations.

**2.4 Task D** – Perform review of ILS documentation and technical data (technical manuals, conversion instructions, Ships Installation Drawings, control system documentation, contract Engineering Change Proposals, Planned Maintenance System documentation and final Configuration Drawings) for the conversion from R-114 to HFC-236fa for all ship classes and air conditioning capacity, for the HFC-134a refrigeration/rotary systems, HFC-134a air conditioning systems and legacy systems.

- 2.4.1 Develop information data packages and support documentation including graphic and tabular printouts, logs, summary reports of equipment.

**2.5 Task E** – Provide technical support and training for the installation of HFC-236fa A/C plant conversion kits, HFC-134a refrigeration/rotary systems and HFC-134a air conditioning systems as well as legacy systems.

- 2.5.1 Provide training for installing activities, FTSCs and ships force to operate the various A/C plants with microprocessor control systems.
- 2.5.2 Support shipboard evaluation and testing programs. Provide summary reports of shipboard equipment operation or maintenance problems.
- 2.5.3 Provide recommendations to resolve issues/problems experienced with the fleet's heating, ventilation, air conditioning, refrigeration and chilled water systems.
- 2.5.4 Support lessons-learned conference on prototype shipboard AC conversions.

### **3.0 Personnel**

#### **3.1 General Requirements:**

- 3.1.1 The personnel qualifications set forth herein are the minimum qualifications acceptable for performance under this contract. Degree or certificate requirements must be satisfied by degree/certificate from an accredited school.
- 3.1.2 Be a U.S. citizen.
- 3.1.3 Have a security clearance at the CONFIDENTIAL level.
- 3.1.4 Have demonstrated skills commensurate with the position.

#### **3.2 Specific Requirements:**

##### **3.2.1 PRINCIPAL ENGINEER (key)**

The desired levels of experience and educational background for the Principal Engineer are:

- 3.2.1.1 Specialized Experience: Experience within the last six (6) years is required in at least eight (8) of the following:

- (1) Conversion of CFC-114 centrifugal A/C plants to ozone-friendly refrigerant HFC-236fa aboard Navy ships.
- (2) Laboratory testing of A/C plants with CFC-114, HFC-236fa and HFC-134a.
- (3) Development of HFC-236fa conversion kits including gear/impeller selection and AC plant control algorithms.
- (4) Preparation of logistic documentation incorporating HFC-236fa modifications.
- (5) Modeling of a thermodynamic and/or a fluid system to predict system performance.
- (6) Participation in HFC-236fa training programs.
- (7) Direct laboratory experience with the design/integration of hardware in a test facility.
- (8) Direct laboratory experience with implementation of instrumentation and data acquisition systems.
- (9) Direct experience with data reduction and analysis.
- (10) Resolve issues/problems experienced with the fleet's heating, ventilation, air condition, 4refrigeration and chilled water system.

3.2.1.2 General Experience – Fifteen (15) years total experience in Navy heating, ventilation, air conditioning, refrigeration and chilled water systems. Five (5) years of this experience shall be in HVAC equipment and the Chlorofluorocarbon (CFC) Elimination Program.

3.2.1.3 Education – A Master's degree in Mechanical Engineering.

3.2.1.4 Patents – Patents obtained within the past fifteen (15) years in fields related to the Statement of Work In Section C.

3.2.1.5 Technical Publications – Technical articles, reviews, and books published within the past fifteen (15) years in fields related to the Statement of Work In Section C.

### **3.2.2 ADMINISTRATIVE ASSISTANT (non-key)**

The desired levels of experience and educational background for the Administrative Assistant are:

3.2.2.1 Experience: Two (2) years experience within the last two (2) years is desired in the area of technical typing and editing technical documents.

3.2.2.2 Education: A high school/vocational school diploma or GED certification.

## **4.0 MATERIALS**

The materials and services to be furnished under this contract shall be only those kinds and quantities of materials and services specified in the Delivery Order and/or required to perform a particular task. The contractor shall be reimbursed for the actual material costs as determined and approved by the cognizant Defense Contract Audit Agency.

## **5.0 GOVERNMENT FURNISHED INFORMATION (GFI)**

Government Furnished Information shall be furnished by the Government to allow successful completion of the tasks as outlined in this contract and will be specified in the Delivery Orders placed against the contract. Examples of such information include:

- (1) Mechanical design information on Air Conditioning and Refrigeration Plant components and systems
- (2) Information concerning the RDT&E objectives of the CFC/Halon Elimination Program
- (3) Any government-developed information necessary for report generation

Plans, drawings, specifications, designs, photographs and any other engineering and manufacturing information furnished by the Government shall remain Government property and shall be reproduced only as authorized in writing by the Government, shall be used for performance of the work under a specific delivery order only, and shall be returned to the Government upon request. Such a request may be made during the subject contract performance or at termination or completion of the subject contract, and the contractor shall thereafter make no further use of any information derived therefrom without prior written consent of the government.

## **6.0 Deliverables and Performance:**

Place and time of delivery of documentation shall be as specified on the DD 1423 (Contract Data Requirements List) that will be submitted with individual delivery orders. The following types of data shall be delivered

### **6.1 Monthly Progress Reports (A001)**

Monthly progress reports shall be submitted to the COR describing by Delivery Order tasking efforts performed, deliverables provided, and funds expended in the previous month.

### **6.2 Technical Report – Study/Services (A002)**

Technical reports shall be prepared as specified in the Statement of Work for each delivery order using ANSI/NISO Z39.18-1995, “Scientific and Technical Reports – Elements, Organization and Design”. For report numbering, the contractor shall use ANSI/NISO Z39.23-1997, “Standard Technical Report Number Format and Creation.” Each technical report may include up to seventy-five (75) pages of both text and figures that require the use of color for explaining the complicated concepts being reported.

### **6.3 Presentation Material (A003)**

Presentation material shall be prepared as specified in the Statement of Work for each delivery order.

### **6.4 Other Documentation:**

Other documentation, as described in the Contract Data Requirements List (CDRL) shall be submitted as required by Delivery Order Tasks. This includes documentation of the following types: summary reports, letter reports, graphic and tabular printouts, data logs, and copies of viewgraph presentations. Informal summary type and management reports may be prepared in accordance with the latest version of the Style Guide for Technical Reports at DTNSRDC.

## **7.0 PLACE OF DELIVERY**

Destinations for any items to be delivered shall be specified in the orders under this contract and in accordance with the DD Form 1423 (CDRL) applicable to each delivery order placed.

## **8.0 TIME OF DELIVERY**

The time of delivery shall be specified on each Delivery Order issued under this contract, unless delivery is deferred at the Government's option by written order of the Contracting Officer.

## **9.0 CONTRACT PERIOD OF PERFORMANCE**

The period of performance of the contract, for the purpose of issuing Delivery Orders hereunder, is from time of contract award to 5 years. (Contract expiration, date will be 5 years and 6 months from the date of contract award).

## **10.0 PLACE OF PERFORMANCE**

It is anticipated that the major effort to be performed hereunder will be accomplished at the Contractor's facility, The Carderock Division, Naval Surface Warfare Center (NSWCCD), West Bethesda, MD, site and Philadelphia, PA detachment, and other Navy and contractor facilities.

#### **11.0 TECHNICAL CONFERENCES**

Contractor personnel shall be available for informational meetings with technical personnel at NSWCCD, both at the West Bethesda, MD site and the Philadelphia, PA detachment to discuss the direction, progress, and/or problems that occur during the performance of each delivery order placed.

#### **12.0 TRAVEL REQUIREMENTS**

The contractor will be required to make visits from time to time in the performance of various tasks assigned under this contract. Such visits will be to various Naval activities and to other contractors associated with the CFC Elimination Program (e.g., Norfolk, VA; San Diego, CA; York, PA; Mayport, FL; and other places as appropriate).

#### **13.0 GOVERNMENT FURNISHED MATERIAL (GFM)**

Materials shall be furnished by the Government to allow successful completion of the tasks outlined in this contract will be specified in the Delivery Orders placed against the contract.

#### **14.0 DESIGNATION OF CONTRACTING OFFICER REPRESENTATIVE (COR)**

The Contracting Officer hereby designates the following person as Contracting Officer's Technical Representative (COR) for this contract: Mr. Matt Frank, Code 822.

#### **15.0 SECURITY REQUIREMENTS**

This contract requires the contractor to use and generate data classified at the CONFIDENTIAL level, in accordance with the attached Form DD 254. The contractor is required to have a facilities clearance at the CONFIDENTIAL level. All personnel working on this contract must have a CONFIDENTIAL security clearance.